he can now run, throw his azigai, and perform any other active feat, as well as any of his most agile companions.

"I confess," remarks Mr. Forde, "I am at a loss to account for the protrusion of a piece of lung, (and lung it most decidedly was, having been carefully examined by Assistant Surgeon Bickersteth and myself, and its texture and appearance could not easily be mistaken,) in the centre of the right hypochondriac region, as connected with the apparent course of the wound, unless it be assumed that at the moment it was inflicted, the man had been in some extraordinary crouching position. Of necessity the diaphragm, with its pleural and peritoneal coverings, must have been perforated, and yet the man recovered without a single symptom of pleuritic, peritoneal, or pulmonic inflammation."

D. F. C.

Art. XV.—*Essay on the Mineral Waters of Carlsbad, for Physicians and Patients.* By Chevalier John de Carro, M. D., of the Faculties of Edinburgh, Vienna, and Prague, and Physician at Carlsbad during the season. *With Observations on the Microscopic Animalcules about the Hot Springs of Carlsbad.* By Mr. A. J. C. Corda, of Prague, and a Flora of Carlsbad, by Professor C. B. Presl, of Prague. 12 mo. pp. 136. Prague: 1835.

Wenzel Payer, of Ellbogen, wrote the first medical treatise, in 1521, upon the waters of the ancient and far famed thermal springs of Carlsbad, but their virtues had been sung in Latin hexameters five and twenty years previously by Bohuslas de Lobkowitz, a Bohemian nobleman. These springs have been the constant resort, since the fourteenth century, of crowds of people labouring under almost every form of disease, or belonging to that class in society, happily more numerous in Europe, than in this country, who spend the better part of their lives in search of the means for restoring that health which, by a luxurious and intemperate course of living, they are hourly rendering more and more infirm.

Formerly the mineral waters of Carlsbad had a reputation for remedial virtues, in numerous complaints and infirmities, which later experience has shown to be greatly overrated—but even at the present day, when their active properties, as well as their effects upon the living system, both in health and disease, are well understood, they have lost nothing of their former fame—thousands of patients still resort to them annually, from almost every part of Europe: thus in 1834, the number of permanent visiters amounted to 6165 individuals.

Carlsbad is situated sixty German miles from Vienna, and sixteen from Prague, in a deep and narrow valley, between granitic rocks, on both sides of the Teple, which empties itself into a larger river, the Egra, very near the town. The houses are all built on the declivity of the hills, and on the banks of the Teple. These hills beautifully wooded, offer innumerable and well kept walks, a great variety of prospects, and an interesting field to lovers of geology and botany. According to the late observations of David, Royal Astronomer at Prague, Carlsbad lays in 50° 13′ 38″ of Lat., 30° 32′ 47″ Long., and 182 fathoms above the level of the sea near Hamburgh.

All the hot springs of Carlsbad rise from the same natural reservoir, by different orifices, each having a different name and temperature. Their number has often varied, new ones occasionly appearing, while others disappear and are again restored. The boiler which supplies them all, is formed from the mineral sediments of the water itself, and has a depth, thickness, extent and ramifications, which no human eye can scrutinize, while the enormous mass of hot and dense vapour, escaping from every accidental or artificial opening, will probably baffle all attempts to ascertain the dimensions of this wonderful laboratory. Such trials were made in 1713 and 1727, after a rupture of the boiler had occurred. The various boring and probing instruments penetrated through the calcareous crust, from one cavity to another, until at length they arrived at an immense reservoir, the boundaries of which could not be reached by poles joined together to the length of thirty fathoms. That a great part of the town stands upon these cavities is sufficiently demonstrated, whenever the foundation of a new house is laid: copious streams of carbonic acid gas are likewise seen constantly bubbling up from the river, near the wells.

The Sprudel spring to which superior powers are attributed, is situated on the right bank of the river, in the centre of the town its temperature is 168° Fahrenheit. It has various orifices, two of which only are adapted to public use. The vapour of one of these supplies the steam baths. Broad square stones and long boards are placed over the thermal chaldron to protect it against the large masses of ice and floating trees, which, in their rapid course, when a thaw or inundation takes place, might break through the crust, and disturb the equilibrium indispensable to the regular spouting of the water. In order to prevent such ruptures, the repair of which is always slow, troublesome and expensive, the incrustation about the orifices of the spring is removed four times a year by a boring apparatus.

The springs of the Sprudel fountain are thus explained: The upper parts of the reservoir become filled with carbonic acid gas, which escapes the more freely from the hot fluid mass below, as the pressure upon the latter diminishes with the evaporating of the gas. In this free state, the gas accumulates in the upper part of the cavity, and finally depresses the surface of the water, which rushes out of the same orifice—the two in the form of vapour escape together, giving in a minute, without intermission, eighteen or twenty ebullitions, from four to eight feet high. A hollow, unequal and subterraneous murmur accompanies the emission of so much water, which, divided into myriads of globules, falls back into the same vessel, (now in the form of a large artichoke,) from whence it springs, and is led by lateral pipes to the baths, to the evaporating apparatus for the manufacture of sulphat of sodæ, and to the adjoining river. The height of the springs can be increased more or less, according to the breadth and length of the square wooden pipe, through which the water ascends; it nevertheless remains a springing fountain, without the addition of a pipe. The Mühlbrunn with a temperature of 135° Fahrenheit; the Neubrunn, 147° Fahrenheit; and the Theresienbrunn 132° Fahrenheit, on the left side of the Teple, communicate together, and like the Sprudel fountain, are decorated with elegant buildings, collonades and gardens. The Schlossbrunn 122° Fahrenheit, is much less frequented, on account of its elevated situation, while the cavernous Bernardsbrunn is scarcely accessible to drinkers; its abundant water, nearly as hot as the Sprudel, is led into a reservoir, necessary for cooling the Mühlbrunn baths. Some opthalmic patients use its vapour at random, without medical advice. The Spitalbrunn supplies the baths of the St. Bernard's Hospital, and is frequented only by the inmates of that institution.

M. Berzelius found that every 1000 parts by weight of the Sprudel water, contained—

Sulphate of Soda	2,58713
Carbonate of Soda	1,26237
Muriate of Soda	1,03852
Carbonate of Lime	0,30860
Fluate of Lime	0,00320
Phosphate of Lime	0,00022
Carbonate of Strontian	0,00096
Carbonate of Magnesia	0,17834
Sub-phosphate of Alumine	0,00032
Carbonate of Iron	0,00362
Carbonate of Manganese	0,00084
Silicia	0,07515=5,45927

The Mühlbrunn, Neubrunn, and Theresienbrunn were found to contain, not only the same ingredients, but in precisely the same proportions.

Becher ascertained that the Carlsbad water possessed as much carbonic acid as its bicarbonates could contain, with the exception of that of the Sprudel fountain, in which there was rather more. The Theresienbrunn contains likewise one per cent. of azote.

It appears that for a long time the Carlsbad waters were employed almost exclusively, as a remedial agent, in the form of baths—on the suggestion, however, of Wenzel Payer, in 1521, they became also to be used internally, while, since 1827, exposure to the steam arising from the springs, was conjoined to bathing in the water and its internal use. The junction of these three curative means, the author remarks, has manifestly increased the fame of these springs. Although they are all often prescribed in the same case, drinking the water is still considered as the most important. A great many patients are cured without either water or vapour bathing, but few by bathing without drinking.

Whichever of the springs patients are recommended to, they come regularly from six to eight o'clock in the morning. Some drink a few goblets in the evening. The interval prescribed between the draughts being fifteen minutes, scarcely more than nine or ten can be taken within the two hours. This quantity proves sufficient in most cases—many patients, however, using a much greater number, begin earlier. Formerly, we are informed, when the purgative effect of the waters was deemed the most important, physicians encouraged plentiful drinking, but since their alterative and slowly deobstruent action has been better understood, and it has been found that the alvine discharges are seldom proportioned to the quantity of water drunk, they have, in general, advised patients in the use of the water not to overpass that degree of saturation which borders on disgust.

The season usually begins at Carlsbad on the 1st of May, and terminates by the end of September. The action of the waters upon the cutaneous functions being promoted by warm weather, June, July, and August, are the months during which the greatest number of visiters attend.

The water of these springs occasions neither nausea nor vomiting; it has an exciting action on the stomach, bowels, kidneys, liver, and other abdominal organs, augmenting their secretions and excretions. It acts especially upon the blood-vessels, creates often an orgasmus and palpitations with determination to the head. It increases indirectly the activity of the lymphatic system, and only becomes a tonic after it has augmented the secretions and excretions. The disorders to which these waters are considered as best adapted, are those proceeding from "stagnation and obstructions of the blood-vessels, or of the organs copiously provided with them," giving rise to "weakness of the stomach, heart-burn, acidities, swelling, eructations, costiveness, which, complicated with derangements of the nervous system, obstruct the liver, the spleen, the mesentery, the epiploon, produce biliary concretions, jaundice in all its degrees, hypochondriasis with its visions, fluent and blind piles, head-ache, vertigo, and all sorts of arthritic, herpetic and urinary complaints."

The waters used as a bath, "assist powerfully the internal cure, in a variety of rheumatic, gouty and herpetic cases—and often facilitate the passage of biliary and urinary concretions; they are more efficacious, and less productive of congestions, when the secretory and excretory action of the water on the bowels and kidneys has already commenced."

The steam from the springs is applied either as a general or partial bath—if the patient takes only a half-bath, sitting in the box up to the pit of the stomach, he can bear a few degrees of heat more than in a whole bath. Few can support a whole steam bath above twenty minutes, but he can a half bath for a longer period. The head is never exposed to the vapour, in consequence of the carbonic acid gas, with which it is combined. "Some patients, labouring under *tic douloureux*, after having tried innumerable remedies, and even surgical operations, have been, if not radically cured, at least essentially relieved," by the steam bath. It has also proved useful in some cases of deafness—"if such patients cannot support the stream of the vapour-douche in the inside of the ear, it must be directed to the neighbouring parts of the organ. In rheumatism, lumbago, sciatic, stiffness of the joints, contractions of muscles," the vapour affords a precious remedy whenever these cases are unattended with febrile symptoms. In herpetic eruptions, and "in the herpetic spots," they are useful, conjointly with the internal use of the waters, but far less than the sulphureous fumigations.

The patients who resort to Carlsbad are placed under an appropriate and regulated regimen and diet, which no doubt has a very powerful influence in augmenting the curative effects ascribed to the waters. Carlsbad, remarks our author, being nothing more than a most elegant hospital, is by no means a place of dissipation. The amusements are of a quiet and moderate kind; the necessary early hours for attending the wells in the morning prevent late ones at night; the strict prohibition of hazard games; the obligation of submitting to a sober diet, and of taking much bodily exercise, have introduced very regular habits into society, and more than one gastronome and hard drinker has began at Carlsbad to understand the incalculable advantages of sobriety and temperance.

To the essay of Dr. De Carro is appended some very interesting observations upon the microscopic animalcules found about the hot-springs of Carlsbad. The wood and stones, as well as the boards and pipes in the immediate vicinity of the wells, are covered with a slimy, gelatinous green substance, of more or less thickness, and often lamellous. Carefully examined, this matter is found to be composed of myriads of elegantly and symmetrically formed beings, of an infinite variety of forms, most of them belonging to the animal kingdom; the forms, modes of life and propagation of which, cannot but excite the highest degree of astonishment. These animalcules, whose size is frequently only the fifteen millionth part of a Paris inch, and seldom more than the nine thousandth, are endowed with organs, simple indeed, if compared with those of a higher order of animals, but complicated proportionally to their own bodies. They move, give signs of feeling, of self-preservation and of propagation, and often even of the means of appropriating to themselves extraneous substances, foreign to their nature. M. Corda divides these animalcules, according to their organization, into two classes, subdivided into six families. The three first families have a brittle tegument; the three last a flexible one. A description is given of the external forms, organs of motion, nutrition, and propagation of these animalcules, which our limits will not permit us to copy; nor would it be very intelligible, unless accompanied by the drawings given in the work before us. Neither have we room for a notice of the Flora of Carlsbad, by Professor Presl, with which the volume closes.

The entire work is an extremely interesting one; and although we might with propriety regret that that portion of it which is strictly medical had not been presented in a more scientific form, and that the author had not entered more into details, when treating of the therapeutical application of mineral waters that have obtained so much celebrity in the cure of disease as to be imitated artificially at Brighton in England, we shall refrain from finding any fault until some one from among our own physicians shall present us with better accounts of the more noted mineral springs of this country. D. F. C.